

Delhi Public School Aligarh
Holiday Home Work for session 2019-20
CLASS XII

English

Write an article in 150-200 words on the following topics in writing skills notebook:

- Justice delayed is justice denied
- Addiction to Whatsapp ,Facebook and other social sites
- Media Biasing – Controlled by ruling party
- India -not mature enough for effective coalition governments
- Atrocities on women

PHYSICS

Students of class XII are instructed to prepare a project report on below mentioned topics and submit the same in first week of July positively.

TOPICS FOR PROJECT REPORTS

- 1. STUDY OF ZENER DIODE AS A VOTAGE REGULATOR,***
- 2. STUDY OF RAIN ALARM SYSTEM,***
- 3. STUDY OF INDUCTOR & FACTORS AFFECTING INDUCTANCE,***
- 4. STUDY OF AC GENERATOR,***
- 5. STUDY OF PHOTO DIODE AND ITS PARAMETERS,***
- 6. STUDY OF TRANSFORMER,***
- 7. STUDY OF MOVING COIL GALVANOMETER AND CONVERSION OF GALVANOMETER IN TO AMMETER & VOLTMETER,***
- 8. STUDY OF SOLAR CELL AND ITS PARAMETERS,***
- 9. STUDY OF RECTIFIER AND ITS APPLICATION,***
- 10. STUDY OF CAPACITOR AND FACTOR AFFECTING CAPACITANCE OF A CAPACITOR,***
- 11. STUDY OF CYCLOTRON AND ITS APPLICATION,***
- 12. STUDY OF PHOTOELECTRIC EFFECT AND ITS APPLICATIONS,***
- 13. STUDY OF REFLECTING TYPE TELESCOPE,***
- 14. STUDY OF VERIFICATION OF OHMS LAW BY TAKING DIFFERENT WIRE OF DIFFENT MATERIAL,CROSSECTION OF WIRE , AND LENGTH,***
- 15. STUDY OF INTERFERENCE OF LIGHT,***
- 16. STUDY OF POLARISATION OF LIGHT,***
- 17. STUDY OF DIFFRACTION OF LIGHT,***
- 18. STUDY OF FACTORS AFFECTING INTERNAL RESISTANCE OF CELL,***

- ❖ Students having Class roll. No's from 1 to18, from 19 to36 and from 37 to 54 (if exists) will follow the above sequence of topics.
- ❖ For eg. Roll no. 1,19 and 37 will prepare their project on semiconductor, Roll no. 2,20 and 38 will prepare their project on Rain alarm so on..

CHEMISTRY

- ❖ 1. Prepare an investigatory project assigned to you involving laboratory testing and collecting information from other sources.
- ❖ 2. Revise the following chapters:
 - a) Solutions
 - b) Electrochemistry
 - c) Chemical Kinetics
 - d) Surface Chemistry

BIOLOGY

1- Prepare a project of biology for practical requirement of AISSCE 2019-20 as discussed in the class.

2- Solve the chapter wise questions/assignment given in the class.

3- Prepare first unit for UT 1 of biology to be conducted in July.

4- Complete your biology practical file as discussed in lab.

Mathematics

1. Find the value of the k so that the function f defined below is continuous at $x = 0$

$$f(x) = \begin{cases} \frac{1 - \cos 4x}{8x^2}, & x \neq 0 \\ k, & x = 0 \end{cases}$$

2. If $f(x) = \begin{cases} \frac{x^3 + x^2 - 16x + 2}{(x-2)^2}, & x \neq 2 \\ k, & x = 2 \end{cases}$ is continuous at $x=2$, find the value of k.

3. If $y = \sin^{-1}\{x\sqrt{1-x} - \sqrt{x}\sqrt{1-x^2}\}$ and $0 < x < 1$ then find $\frac{dy}{dx}$.

4. Let $f(x) = \begin{cases} \frac{1 - \cos 4x}{x^2}, & \text{if } x < 0 \\ a, & \text{if } x = 0 \\ \frac{\sqrt{x}}{\sqrt{16 + \sqrt{x} - 4}}, & \text{if } x > 0 \end{cases}$ for what value of a, f is continuous at $x=0$.

5. Differentiate: $\tan^{-1}\left(\frac{\sqrt{1-x^2}}{x}\right)$ with respect to $\cos^{-1}(2x\sqrt{1-x^2})$ where $x \in \frac{1}{\sqrt{2}}, 1$.

6. If $y = (\cos x)^{(\cos x)^{(\cos x)^{\dots\infty}}}$ show that $\frac{dy}{dx} = \frac{y^2 \tan x}{y \log \cos x - 1}$.

7. If $\sqrt{1-x^2} + \sqrt{1-y^2} = a(x-y)$ prove that $\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$.

8. Verify the Rolle's Theorem for $f(x) = \sin^4 x + \cos^4 x$ in $\left[0, \frac{\pi}{2}\right]$.

9. Verify the Mean value theorem for $f(x) = \sin x - \sin 2x$ in $[0, \pi]$

10. Find the angle of intersection of the curves $y^2 = 4ax$ and $x^2 = 4by$.

11. Find the equation of all the tangents to the curve $y = \cos(x+y)$, $-2\pi \leq x \leq 2\pi$ that are parallel to the line $x + 2y = 0$.

12. If the sum of the lengths of the hypotenuse and a side of a right angled triangle is given, show that the area of the triangle is maximum when the angle between them is $\frac{\pi}{3}$.

13. Find the coordinate of the point on the curve $\sqrt{x} + \sqrt{y} = 4$ at which tangent is equally inclined to the axes.

14. Show that $f(x) = 2x + \cot^{-1} x + \log(\sqrt{1+x^2} - x)$ is increasing in R.

15. Using differentials find approximate value of $\sqrt{0.082}$

16. Find all points of local maxima /local minima of the function:

$$f(x) = \frac{3}{-4}x^4 - 8x^3 - \frac{45}{2}x^2 + 150.$$

17. If $x + y + z = 0$, prove that $\begin{vmatrix} xa & yb & zc \\ yc & za & xb \\ zb & xc & ya \end{vmatrix} = xyz \begin{vmatrix} a & b & c \\ c & a & b \\ b & c & a \end{vmatrix}$.

18. Given that $A = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$ $B = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$ find AB and use this to solve the system of equations: $y + 2z = 7, x - y = 3, 2x + 3y + 4z = 17$.

19. Without expanding show that $\Delta = \begin{vmatrix} \operatorname{cosec}^2\theta & \cot^2\theta & 1 \\ \cot^2\theta & \operatorname{cosec}^2\theta & -1 \\ 42 & 40 & 2 \end{vmatrix} = 0$
20. In triangle ABC, If $\begin{vmatrix} 1 & 1 & 1 \\ 1 + \sin A & 1 + \sin B & 1 + \sin C \\ \sin A + \sin^2 A & \sin B + \sin^2 B & \sin C + \sin^2 C \end{vmatrix} = 0$ then prove that ΔABC is an isosceles triangle.
21. Prove that $\begin{vmatrix} bc - a^2 & ca - b^2 & ab - c^2 \\ ca - b^2 & ab - c^2 & bc - a^2 \\ ab - c^2 & bc - a^2 & ca - b^2 \end{vmatrix}$ is divisible by $a + b + c$ and find the quotient.
22. If possible, using elementary row transformations, find the inverse of $\begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$ & $\begin{bmatrix} 2 & -1 & 3 \\ -5 & 3 & 1 \\ -3 & 2 & 3 \end{bmatrix}$.
23. Find the matrix A such that $\begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 & -10 \\ 1 & -2 & -5 \\ 9 & 22 & 15 \end{bmatrix}$.
24. If $a_1, a_2, a_3, a_4 \dots a_n$ is an arithmetic progression with common difference d, then evaluate the following expression.
 $\tan \left[\tan^{-1} \left(\frac{d}{1+a_1a_2} \right) + \tan^{-1} \left(\frac{d}{1+a_2a_3} \right) + \tan^{-1} \left(\frac{d}{1+a_3a_4} \right) + \dots + \tan^{-1} \left(\frac{d}{1+a_{n-1}a_n} \right) \right]$.
25. Show that $\tan \left(\frac{1}{2} \sin^{-1} \frac{3}{4} \right) = \frac{4-\sqrt{7}}{3}$ and justify why the other value $\frac{4+\sqrt{7}}{3}$ is ignored.
26. Find the real solutions of the equation: $\tan^{-1} \sqrt{x(x+1)} + \sin^{-1} \sqrt{x^2+x+1} = \frac{\pi}{2}$.
27. Show that $\tan^{-1} \left\{ \tan \frac{\alpha}{2} \cdot \tan \left(\frac{\pi}{4} - \frac{\beta}{2} \right) \right\} = \tan^{-1} \frac{\sin \alpha \cos \beta}{\cos \alpha + \sin \beta}$.
28. Find the values of x which satisfy the equation $\sin^{-1} x + \sin^{-1} (1-x) = \cos^{-1} x$.
29. Which is greater, $\tan 1$ or $\tan^{-1} 1$?
30. Let R be a relation defined on the set of natural number N as follows
 $R = \{(x, y) : x, y \in N, 2x + y = 41\}$. Find the domain and range of R. Also verify whether R is reflexive, symmetric and transitive.
31. Show that the function $f: R \rightarrow R$ defined by $f(x) = \frac{x}{x^2+1} \forall x \in R$ is neither one-one nor onto.

IP/CS

Create a project using Python and MySQL with Database connectivity. Topic can be taken by your choice eg. Hotel Management system, School Management System Etc.

Physical Education

Solve all the questions containing 5marks at end of each chapter from unit one to unit four, in a separate notebook which should be meant for only Physical education
 Draw neat diagrams of various Asana curing daily lifestyle's problems in human beings along with their other benefits.